APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/699,894	10/30/2000	Mukund Padmanabhan	YOR20000388US1	7224

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EXAMINER
HAN, QI

ART UNIT	PAPER NUMBER
2626	

MAIL DATE	DELIVERY MODE
09/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	**Applicant(s)**
Office Action Summary	09/699,894	PADMANABHAN ET AL.
	Examiner	**Art Unit**	
	Qi Han	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>03 July 2007</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-7,10-14,17 and 18* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-7,10-14,17 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>30 July 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Continued Examination Under 37 CFR 1.114

2.   A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Response to Amendment

3.   This communication is responsive to the applicant's amendment and RCE examination both filed on 07/03/2007. The applicant(s) amended claims 1, 7 and 13, and cancelled claims 2, 8 and 15-16 (see the amendment: pages 2-5).

Response to Arguments

4.   Applicant's arguments filed on 07/03/2007 with respect to the claim rejection under 35 USC 102/103, have been fully considered but are moot in view of the new ground(s) of rejection, since the amended claims introduce new issue/matter, which change the scope of the claims (see detail below).

In response to applicant's arguments regarding claim rejection under 35 USC 112 1st, the

examiner has reviews the original specification and believes that the arguments based on the

newly amended claims (Remarks: page 8, paragraphs 2-3) are not persuasive because the

amended limitation does not specifically described in the original specification (see detail

below).

In response to applicant's arguments regarding the rejection of claim 18 under 35 USC

112 2nd, the examiner respectfully sustains the rejection because the rejection is not about "not

having proper support in the specification" as argued by the applicant (see Remarks: page 9,

paragraph 1), but about "being indefinite for failing to particularly point out and distinctly claim

the subject matter which applicant regards as the invention." It is noted that the claim is

interpreted in light of the specification, not read into the specification. Further, it is reminded

that it is applicant's responsibility to provide clear claims, without indefinite term(s), but in this

case, the applicant failed to do so. In addition, even though the arguments provide the referenced

specification content for the undefined variables in the claimed equation (see Remarks: page 9,

paragraph 1), some variable, such as θ^T (see specification: page 10, lines 6-8), is still undefined,

so that the corresponding limitation is indefinite too.

Specification

5.   The disclosure is objected to because of the following informalities:

a.   on page 2, lines 6-8 and page 7, lines 13-15, the applicant failed to describe a

complete subject matter in the specification from the mentioned reference of Fukunaga, or

provided the corresponding disclosure of the reference in an IDS filing. It is remained that it is

applicant's responsibility for providing copies of the relating subject matter incorporated by

reference in NPL. Appropriate information regarding the related subject matter is required.

      b.   on page 10, first line, the equitation appears to be incorrect because there is no

variable j in it. Appropriate correction is required.

Claim Rejections - 35 USC § 112

6.   Claims 1, 4-7, 10-14 and 17-18 are rejected under 35 U.S.C. 112, first paragraph, as

failing to comply with the written description requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to reasonably convey to one skilled

in the relevant art that the inventor(s), at the time the application was filed, had possession of the

claimed invention.

      Regarding claims 1, 7 and 13, the limitation "said objective function maximizes an

average pairwise divergence **over all dimensions at a single step**" introduces new subject

matter, because the limitation is not specifically described in the original specification. It is noted

that the specification contents (i.e. page 6, line 15-page 7, line 5; page 10, equation (7) and

related text; and page 14, line 10-page 15, line 11) referenced by the applicant (see Remarks:

page 8, paragraph 8) do not disclose any claimed "**at a single step**", nor argued "**non-**

incrementally". In contrast, the applicant admitted "no analytical solutions for the stationary

points" and "instead, one has to use numerical optimization routines for the maximization of D_θ

(referred to the object function of equation 7)" (specification: page 11, lines 7-10), which

suggests that maximizing objection function is **not** "at a single step", but iterative multiple steps

suggested by prior art (Decell, see below).

Regarding claims 4-6, 10-12, 14 and 17-18, the rejection is based on the same reason

described for claims 1, 7 and 13, because the dependent claims inherit the same problematic

limitations as their parent claims.

7.   Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

Regarding claim 18, none of the variables in the claimed equation is defined so that the

variables themselves and the equation are indefinite. It is noted that the claim is interpreted in

light of the specification, but not read into the specification. In addition, even though the

arguments provide the referenced specification content for the undefined variables in the claimed

equation (see Remarks: page 9, paragraph 1), some variable, such as θ^T (see specification: page

10, lines 6-8), is still undefined, so that the corresponding limitation is indefinite too.

Claim Rejections - 35 USC § 103

8.   Claims 1 and 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Watanabe et al. (US 5,754,681 A) hereinafter referenced as Watanabe in view of Decell et al.

(IDS: "An iterative approach to the feature selection problem, Machine Processing of remote

sensing data, 1972) hereinafter referenced as Decell.

As per **claim 1**, as best understood in view of the rejection under 35 U.S.C. 112 1st (see

above), Watanabe discloses 'signal pattern recognition comprising parameter training controller

for training feature conversion parameters and discriminant functions' (title), comprising:

"inputting a pattern" (Fig. 1, 200; Fig. 2, 'inputted signal pattern');

"transforming the input pattern to provide a set of at least one feature for a classifier

which classifies into classes, wherein there is only one feature space transform for all class" (Fig.

2; col. 1, lines 30-42, 'transform an inputted signal pattern…into a feature value, or a low-

demission information (one feature space transform) representing a class');

"minimizing the probability of subsequent misclassification of at least one feature in the.

classifier" (col. 18 lines 9-24, Fig. 7 steps 4-5, col. 23 lines 50-59 and col. 24 lines 15-30);

"developing an objective function" (col. 18 lines 59-68); and

"optimizing the objective function through gradient descent", (col. 19 lines 1-10,

'gradient method such as a steepest descent method in a batch processing').

It is noted that Watanabe does not expressly disclose "said objective function maximizes

an average pairwise divergence over all dimensions [at a single step]." However, the feature was

well known in the art as evidenced by Decell who disclose 'an iterative approach to the feature

section problem' (title) providing 'the b-average divergence for m-distinct classes' (abstract),

comprising 'performing the transformation y=Bx' such that 'n-dimensional classification

problem transformed into a k-dimensional problem' and 'the minimal probability of

misclassification resulting from applying a maximum likelihood classification procedure' (page

3B-1, section 1 Introduction); defining 'the average divergence for m classes' and 'B-average

divergence' (D_B) (corresponding to the objective function) 'to maximize D_B' by using

'transformation y=Bx' (wherein B is k x n matrix, i.e. n--k dimensions, read on over all

dimensions) for 'all distinct class pairs' (interpreted as average pairwise divergence) (page 3B-2,

paragraphs 2-4; page 3B-5, lines 15-24). Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made to modify Watanabe by providing

maximizing b-average divergence (D_B) using matrix B for all distinct class pairs for the

classification, as taught by Decell, for the purpose (motivation) of providing minimal probability

of misclassification and/or reducing classification time (Decell: page 3B-1, introduction).

As per **claim 4** (depending on claim 1), Watanabe in view of Decell further discloses

"querying whether the optimized objective function converges" (Watanabe: col. 21 lines 18-21;

Decell: page 3B-9, last paragraph of the section 3 Numerical Results and Fig. 1).

As per **claim 5** (depending on claim 4), Watanabe in view of Decell further discloses

"repeating an optimizing step if the optimized objective function does not converge" (Watanabe:

col. 24 line 22; Decell: page 3B-5, last line and title).

As per **claim 6** (depending on claim 1), Watanabe in view of Decell further discloses

"pattern recognition is speech recognition" (Watanabe: col. 1, lines 10-15).

As per **claims 10-12** (depending on claim 7), the rejection is based on the same reason

described for claims 4-6, because the claims recite the same or similar limitations as claims 4-6

respectively.

As per **claim 14** (depending on claim 1), Watanabe in view of Decell further discloses

"wherein said objection function is an average pairwise divergence related to the probability of is

classification of the projected space based on classes having uniform prior probabilities"

(Watanabe: col. 18 lines 7-35 and 54-67; Decell: page 3B-2 and 3B-5, wherein "average

divergence" and the term "$c=2/m(m-1)$" imply m classes having uniform prior probabilities).

As per **claim 17** (depending on claim 1), Watanabe in view of Decell further discloses

"said objection function comprises means, covariance, and prior probabilities" (Watanabe: (col.

16 lines 32-45 and 63-67; Decell: page 3B-2 and 3B-5, equations regarding D_B and S_i).

As per **claim 18** (depending on claim 1), Watanabe in view of Decell further discloses

"said objection function comprises means, covariance, and prior probabilities (Decell: page 3B-2

and 3B-5, equations regarding D_B and S_i).

Conclusion

9.   Please address mail to be delivered by the United States Postal Service (USPS) as
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        Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Qi Han whose telephone numbers is (571) 272-7604. The
examiner can normally be reached on Monday through Thursday from 9:00 a.m. to 7:30 p.m. If
attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor,
Richemond Dorvil, can be reached on (571) 272-7602.

        Information regarding the status of an application may be obtained from the Patent
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September 10, 2007